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Concrete Roads

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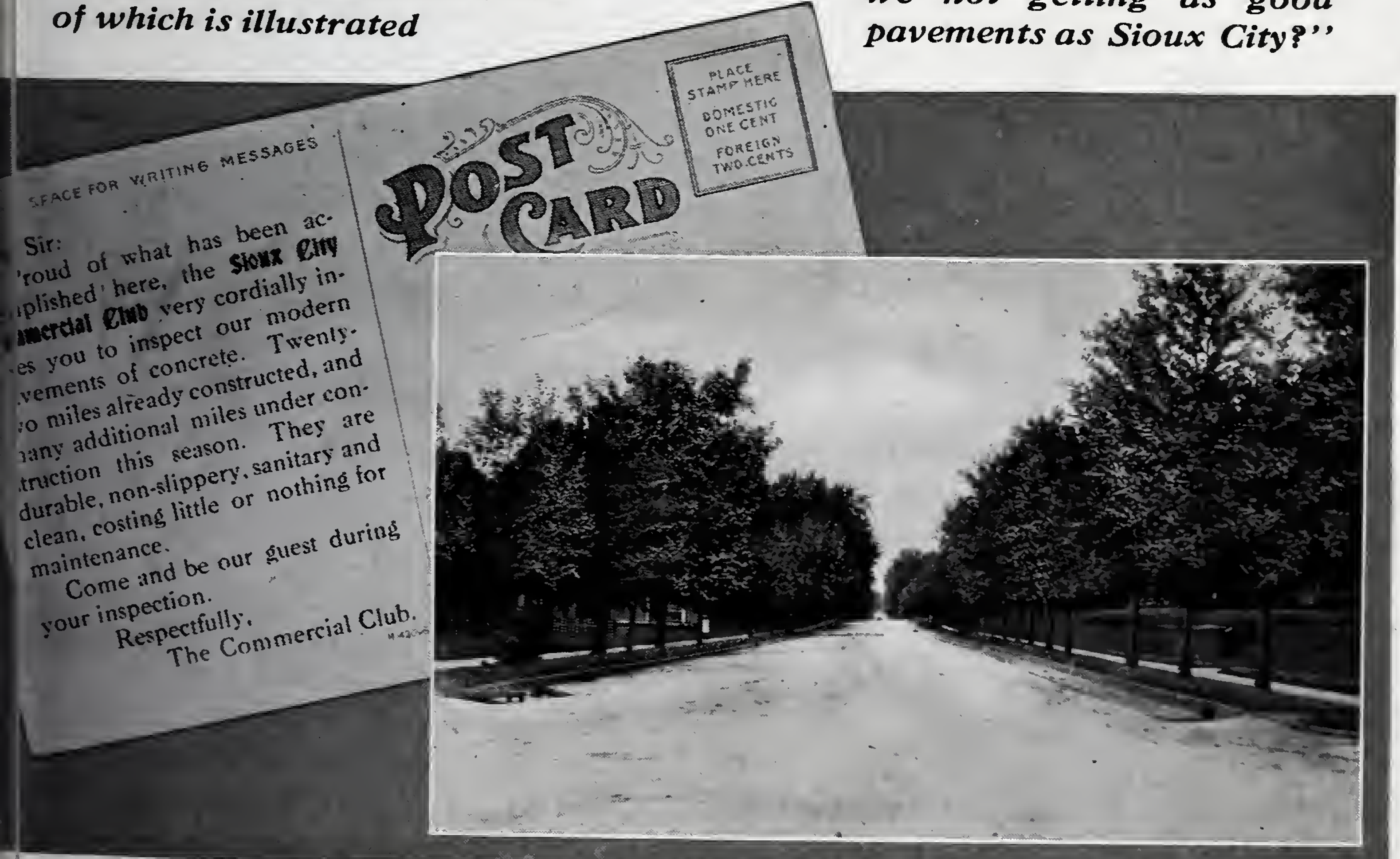
Strong Endorsement of Concrete for Street Pavements

WHEN the Sioux City (Ia.) Commercial Club cordially invites an inspection of its modern pavements of concrete and sends the invitation broadcast throughout the neighboring towns, especially to editors and those having more or less to do with moulding public policies, it is significant of their complete satisfaction with the pavements. The post-card invitations, one of which is illustrated below, went to editors of town papers over a considerable radius around Sioux City and resulted in a good deal of comment, much actual inspection and many editorials, which put the question strongly. "Why are not our pavements such that we are proud of them? Why are we spending money for so-called permanent pavements, which are not permanent? Why are we not getting as good pavements as Sioux City?"

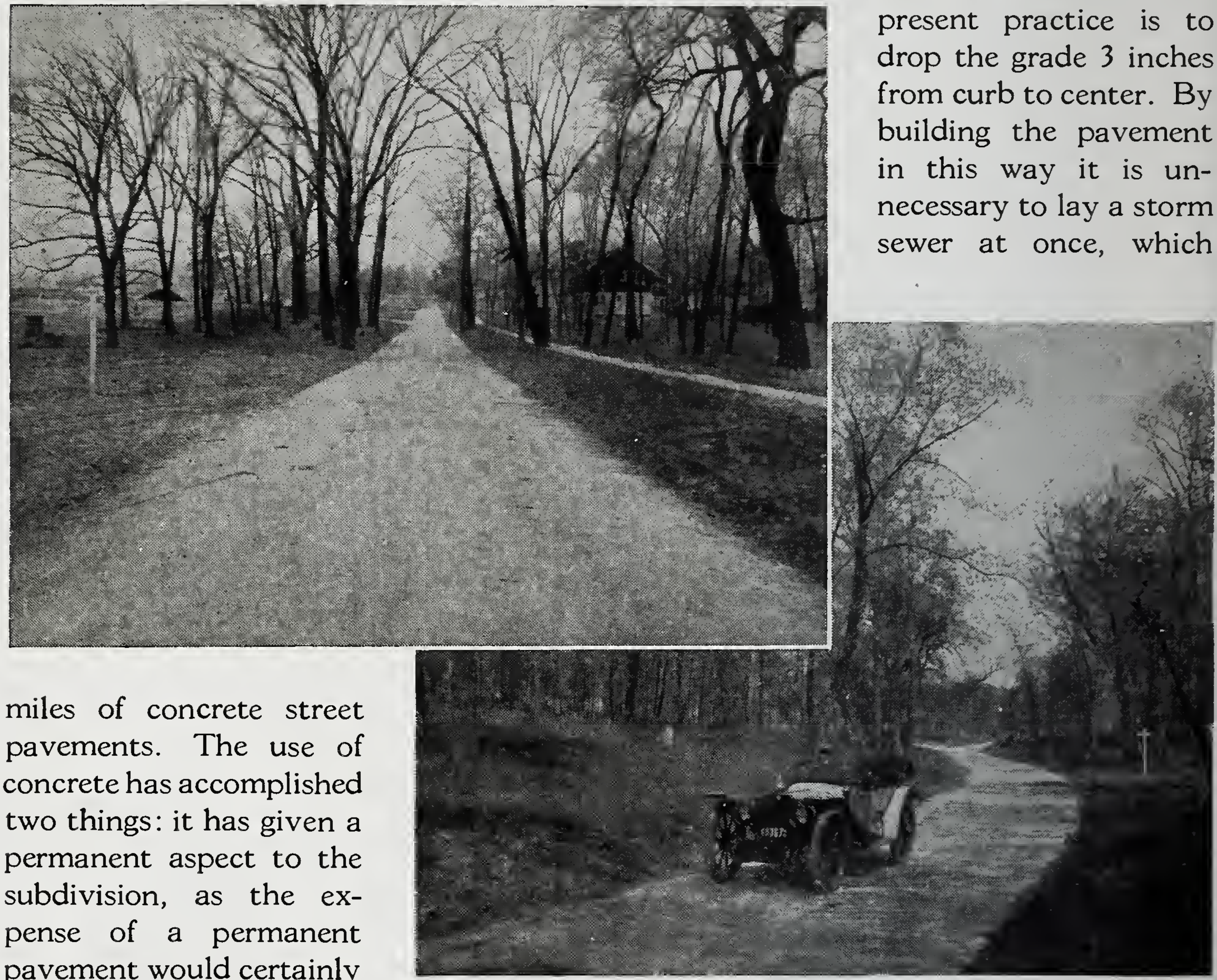


POST CARD
PLACE STAMP HERE
DOMESTIC ONE CENT
FOREIGN TWO CENTS
SPACE FOR WRITING MESSAGES

Sir:
'roud of what has been acuplished' here, the **Sioux City** **mercial Club** very cordially in-es you to inspect our modern vements of concrete. Twenty-o miles already constructed, and iany additional miles under con-truction this season. They are durable, non-slippery, sanitary and clean, costing little or nothing for maintenance.
Come and be our guest during your inspection.
Respectfully,
The Commercial Club.

Concrete Pavements Ideal For New Subdivisions

CEDAR RAPIDS, Iowa, is growing rapidly. The Anderson Land Co. has been energetic in developing a new outlying section, Vernon Heights, and as a first step in preparing for disposal of residence sites, placed about two miles of concrete street pavements. The use of concrete has accomplished two things: it has given a permanent aspect to the subdivision, as the expense of a permanent pavement would certainly not have been incurred in a development thought to be temporary, and, second, it has set a standard for pavements which is not likely to be lowered in future work.



Concrete Pavements in Vernon Heights, Cedar Rapids
An Aid in the Sale of Real Estate

The work was begun in 1913 when 1½ miles of an old country road, known as Glenway Drive, in the subdivision of Vernon Heights, was paved entirely at the expense of the land company, and by a private contractor, F. K. Hahn, of Cedar Rapids. While this work was excellent and fully justified the choice of concrete, yet the specifications have this year been changed to those of the American Concrete Institute which will insure lasting and most satisfactory pavements.

Since no curb has been built on most of the pavement, it was necessary to dish the surface. The present practice is to drop the grade 3 inches from curb to center. By building the pavement in this way it is unnecessary to lay a storm sewer at once, which would otherwise have been immediately necessary. The pavements are built with a thickness of 6 inches at the edge, 8 inches at the center and laid in two courses. All have expansion joints about 32 feet apart. Last year's work included intermediate contraction joints and a longitudinal joint through the center of the wider pavements. This year's work contained only expansion joints at 32-foot intervals, which is standard practice throughout the country.

The Anderson Land Co. is now doing its own work and up to the first of May had laid 4,000 yards of 8-foot pavements at a cost considerably under the previous year's work.

The action of the Anderson Land Company is recommended to all similar companies for opening large tracts of land. It is far more attractive to prospective home builders to find the pavement complete. There is a long period of waiting in the average subdivision for permanent paving and this unnecessarily delays the selling of property, when with an additional initial investment for permanent pavements, might be speedily disposed of. Land companies, however, are to be cautioned against attempts to cheapen the initial cost of concrete pavements. The concrete road or pavement is inherently reasonable in cost, when its long period of service is considered. But it must be made according to definite specifications which are necessary to insure success.

Repaving on Sanitary Grounds

THE VERY nature of a concrete pavement in street or alley precludes the possibility of low spots which become puddles after every rain. Many years of hard service only result in even wear which leaves the surface with practically the original crown.

In contrast with this condition, *Engineering Record* of June 20 calls attention to one dangerous phase of rutted alleys and roads.

"All advocates of various kinds of paving materials emphasize their sanitary qualities, but it is not often that health promotion is given as the sole reason for repaving. In a recent communication to the Detroit City Council certain worn, paved alleys are described as being in an insanitary condition, on account of the depressions, which hold accumulations of filth and stagnant water, creating a nuisance and menacing the health of the public. The Board of Health having concurred, the Department of Public Works therefore recommended repaving. Mosquito breeders in worn-out pavements are just as efficient in raising the spreaders of malaria as a similar puddle in an unpaved street, with the added advantage to the mosquito that the water is not so likely to drain away, thereby ending the existence of the larvae by desiccation. While water trapped in clogged eaves, cisterns, ponds, catch basins, sewers and roadside ditches is no doubt the source of most of the urban mosquitoes, numerous inhabited pools have been found by a representative of this journal in the center of traveled unpaved streets. Perhaps, as in Detroit, citizens in other towns can use the persuasive powers of the health officials to advantage in getting worn out pavements replaced."

Lincoln Highway Tourists on Way from New York to Golden Gate

ON JUNE 4 a small automobile, carrying two men, N. A. Croker and Fred Wilkins, of New York, left that city and headed westward over the Lincoln Highway for San Francisco. On completion of the journey this car will have had the distinction of being the first to make this trip over the highway under official sanction. Leaving New York the rear wheels of the machine were dipped in the waters of the Atlantic and arriving in San Francisco the fore wheels will be dipped in the waters of the Pacific. In the meantime the car will have traveled 3,389 miles and have passed through 540 towns and cities. The route of the car is as follows:

Starting from New York it proceeded to Philadelphia by way of Jersey City and Trenton. Coming west Pittsburgh, Fort Wayne and South Bend, Ind., were touched, the route passing through Joliet, Mooseheart, Aurora and Sterling, Illinois, through Clinton and Cedar Rapids, Iowa, through Denver, Salt Lake City, Reno, Carson City, Sacramento, Oakland and then to San Francisco. The running schedule calls for an average speed of 20 miles an hour and an average distance of 125 miles a day.

Improved Alleys Enhance Real Estate Values

IN THE minds of many, a typical alley is a narrow, deep-rutted thoroughfare, badly drained and much more badly kept. The alley is a social and economic necessity, and since we must have the alley, we should have it not as something to be tolerated, but as an aid to social and economic welfare.

The unimproved alley, paved with ashes and cinders, dumped in promiscuous heaps, soon becomes an expense to the community. The dirt of the alley is dragged out along the paved streets, entailing the expense of street cleaning, money which might otherwise be devoted to substantial alley pavements. A business section, or apartment district, with dirty, unkempt alleys soon becomes known as a cheap neighborhood, property values depreciate and owners of real estate suffer a general loss. Concrete seems to be the ideal pavement for alleys. It is low in cost, but not cheap in any sense of the word. The success of concrete as a paving material for alleys can be realized from the following figures:

Richmond, Indiana, has nearly 30,000 yards of concrete alleys, some of which have been in service for 17 years. Dayton, Ohio, has a total of 43,000 yards.

Real estate values which are depreciated on account of badly kept alleys are similarly enhanced through their improvement. Illustrative of this are several alleys in Watertown, S. D. An alley known as the Midway leading directly to the main entrance of the Courthouse has been paved with concrete, thus providing a double frontage to the property abutting this alley, and thereby increasing returns on the investments. The management of the largest concrete fireproof building in Watertown has improved its alley frontage with large plate glass show windows, and as the alley is paved with concrete, these windows become as effective as those located on the main frontage, on account of the accessibility, provided by means of the paved alley.

Showing Windows on a Concrete Alley at Watertown, S. D.

The Midway, a Concrete Paved Alley at Watertown, S. D.

It must be remembered that good homes should have good pavements, and by pavements we mean alley pavements as well as street pavements. Concrete alleys promote cleanly and sanitary conditions.

Trackless Traffic

THE Saturday Evening Post, June 20, printed the following: "We expect to see a time when the amount of freight moved by mechanical power on highways will exceed that moved on tracks. There is no question that the freight movement on highways already exceeds that on tracks.

"The first item in railroad traffic, as reported by the Interstate Commerce Commission, is agricultural and animal products, amounting to two hundred million tons. Nearly all of it was hauled in wagons to the railroad station and distributed to consumers in wagons. A large part of nearly three hundred million tons of manufactures was hauled in wagons. So, throughout the list, the railroad haul generally implies a wagon haul at one end or both ends. And there is a large freight movement by wagon that does not get to the railroads at all.

"Everybody knows that wagon haulage, on a broad view, is vastly more expensive than rail haulage. Investigation has disclosed numberless cases in which the cost of hauling a given article two or three miles by wagon exceeded the cost of hauling it many times that distance by rail. Formerly trackless haulage meant animal power; but the development of gasoline and electric motors within a few years has provided a means of haulage without tracks which, under favorable conditions, is much swifter and cheaper than animal power.

"The first condition is, of course, a good roadway—hard, smooth and well maintained. In cities where pavement provides a good roadway mechanical power is steadily supplanting horses for trackless haulage. With good roads in the country, there is no reason why a great part of the trackless haulage should not be performed by mechanical power, with a large total saving of time and money.

"The rural freight route might well move a great part of the farm's products to market and fetch back most of the farm's supplies; in fact, an expert on the subject has predicted that within a few years a considerable part of what we now regard as main-line railroad freight traffic will move over highways by mechanical power, even for long distances.

"For the achievement of that condition the first requisite is a complete network of good highways."

Out-of-Service Costs

IN HIS address before the Good Roads Congress at Montreal, Canada, May 18, W. P. Blair stated: "That road which calls for the most frequent repairs is the road that is most likely to be out of repair, and it is the road that in the sum of lapses of time in which it is out of repair, aggregates a total detraction from the road's worth which by the lesser load hauled, the broken spring, the injured horses, the extra wear and tear of the vehicle, if converted into dollars, would often equal in a short period of time, the entire original cost of the road improvement.

"When a road is out of repair, the road investment is yielding no return. The road as a whole is only as good as its worst portion. Even the rule of averages will not apply. On the other hand, by inverse ratio the road approaches its maximum worth as repairs are eliminated. The road, therefore, from which repairs are practically eliminated, is the real economic road, provided only that the traffic passing over it meets in a reasonable toll charge, the interest on its cost."

Concrete Adopted for Paving Between Car Tracks

PREVIOUS to 1904 the Minneapolis Street Railway Co. was required by ordinance to pave between its tracks with the same material as used for the balance of the pavement. An amendment to the Street Railway Co.'s franchise in that year permitted the use of granite blocks, which has been the practice up to the present time. The striking success of concrete, however, along some of the lines, and the ease with which a railway organization can lay concrete up to grade, instead of only to the top of the ties, caused the Company's engineers to investigate the matter thoroughly and at their request an amendment was passed.

The first stretch of concrete between tracks is about to be laid on Como Avenue between 17th Avenue S. E. and the eastern city limits. This official sanction for concrete between tracks in Minneapolis is comparable with the experience of Sheboygan, Wis., where concrete has been similarly used with success for some time. It would appear that this is the most economical pavement to lay as well as the most satisfactory.

CONCRETE ROADS

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CONCRETE ROADS will welcome correspondence concerning concrete road "kinks," suggestions for better practice or other points occurring to those having road construction in their charge. It is intended to serve as a medium of expression of the best thought and practice in the field of concrete pavement construction.

GUERNSEY County, Ohio, is now paving a mile of highway with concrete, its first pavement with this material.

DAVENPORT, Iowa, let contracts for 6,000 yards of concrete alley pavement early in June. It is practically the Davenport standard.

ON account of the high cost of paving the aldermen of La Salle, Ill., have decided to use concrete material for that purpose in future pavements.

LAKE COUNTY, Ohio, has let contracts for 54 miles of pavement, a good share of which is to be concrete, on the South Ridge Road.

ON June 16 the State Highway Department of Ohio let road contracts which included 17 miles of concrete roads in 12 sections.

CHISHOLM, Minnesota, has been paving entirely with creosote wood blocks until this year. They are now drawing up specifications for concrete pavements and alleys, to be laid during 1914.

MANKATO, Minnesota, decided on March 30 for 17 blocks of concrete paving. It is probable that they will order 12 more blocks paved this year, and concrete will be the logical material.

THE first concrete pavement in Cass County, Indiana, is planned for a 4,000-foot stretch leading out of Logansport. Bids were received June 4 on concrete only.

PROGRESSIVE contractors are bending extra efforts to increase their efficiency in concrete street and road work because of the realization that this type of road has come to stay, and will be demanded more and more each year.

EARLY in June the citizens of Riverside, Ill., voted favorably on 9,000 square yards of two-course concrete pavement; in addition to which the street railway company will place 5,000 square yards at its own expense.

THE New York State Highway Commission has so far this year let 85½ miles of concrete highway. A year ago the Highway Commission was opposed to the use of concrete.

CERRO GORDO COUNTY, Iowa, is about to pave 1½ miles of concrete highway, meeting a section built last year within the city. The expense will be entirely borne by abutting property owners.

EARLY in April the Board of Local Improvements of Rockford, Illinois, passed favorably on the paving of five alleys with concrete. The paving of alleys is only second in importance to the paving of roads and streets. Each is a tremendous factor in raising civic standards.

THE demand for concrete roads comes from users of horse-drawn vehicles as frequently as it does from owners of automobiles and the objection to concrete, that it is hard on country-bred horses, would seem to be without weight. The opposite is the case.

WELL paved streets and sidewalks are all right as far as they go, but they cannot be kept clean if the alleys are muddy or dusty. There are other types of pavement which have recognized value for streets, but for alleys, concrete is in a class by itself and should be the standard in every locality.

BUILDING material dealers and others requiring roads through their yards will be interested in the experience of the Security Lumber Co., of Gonvick, Minnesota, which has built 100 feet of concrete driveway, 20 feet wide. It is permanent, easily cleaned and does not let trucks sink into the deep "gumbo" mud. It is said to have cost $50.00 less than a plank driveway.

THERE has been a noticeable tendency in recent years to increase the thickness of concrete foundations for pavements. While the common practice in this country is to construct foundations four to six inches thick, it is interesting to learn that the annual report of the Metropolitan Paving Committee of London provides for a foundation six to nine inches thick and under some conditions twelve inches. In all instances where concrete foundations have been built in England, Canada and in the United States under specifications calling for unusual thickness, the results have been uniformly satisfactory.

CAPE GIRARDEAU, Missouri, has 56,000 square yards of concrete roads laid in 1912-13. These have proved so satisfactory that it is planned to lay 44,000 square yards in 1914. The city engineer, C. E. Stivers, had been dissatisfied with the street construction previous to 1911 and on the strength of the reputation of the Wayne County concrete roads, drew up specifications and superintended all construction without ever having seen a concrete road. All except two of the streets are laid in one course with a 1:1½:3 mixture. The work is in excellent condition.

SIOUX CITY, Iowa, has faith in concrete. The fact that its commercial club is inviting inspection of its 22 miles of concrete pavements is significant of complete satisfaction. Any city can duplicate Sioux City's good record. It means a willingness to spend sufficient money to pay for good materials, careful contracting and adequate inspection. But this cost is less than for many other permanent pavements. There is no monopoly on good concrete road materials. There is no monopoly on contracting methods or concreting machinery. No royalties need be paid. For every dollar expended there is a dollar's worth of road service rendered back. Sioux City has found this to be so true that each year sees an increasing yardage, which is the just pride of its citizens.

DES MOINES COUNTY, Iowa, will shortly have a mile of concrete road which resulted from an inspection trip to Wayne County (Detroit), Mich. Several members of the Board of County Supervisors made the trip to see if conditions were actually as good as reported. They came back enthusiastic. One farmer along the road was so anxious for the improvement that he is paying one-quarter of the total cost to secure its immediate construction.

ORANGE JUDD FARMER (Chicago) tells its readers in the issue of April 25, "The advocates of an extensive system of paved highways have an ever ready answer to the landowner who objects to the program on the score of increased taxation. The road tax will never be as high as the mud tax. It will pay you better to expend $50 for good roads than $500 in wasted time and worn-out wagons and horses. That their argument is fundamentally sound is not to be denied."

THREE men from El Paso, Illinois, went to Sheboygan, Wisconsin, to inspect its concrete pavements. This happened about the first of June. Shortly thereafter there was a meeting of townspeople interested in the road situation, and 25,000 square yards of concrete paving are now under way.

El Paso is a town of 1,800 inhabitants, with 250 automobiles. The number of machines and the immediate adoption of concrete as a practical and efficient pavement both indicate a wide awake community.

TRAFFIC generally goes in greatest volumes to the railroad whose passenger and freight stations are most conveniently located and easy of access. Wear and tear on horses and vehicles is a considerable factor. The natural course for a railroad to pursue in increasing its traffic is to provide pavements which will permit easy access.

Concrete is coming into use for this purpose, not only because of its excellent qualities, but because the railroads' own force and equipment can be used to lay concrete pavements while other concrete construction is in progress.

An Endorsement of Concrete Roads From the Standpoint of the Automobilist

SKIDDING automobiles and slipping horses are seldom seen on concrete pavements. Fred S. Smith, City Engineer of Sioux City, Iowa, was recently conducting an inspection party over pavements in that city. On the return trip it started to rain and Mr. Smith found it impossible to keep his machine from skidding and sliding as it passed over several types of pavements. Finally the sliding of his car, due to the slipperiness of the pavements, became so bad that, with the ejaculation, "Me for the concrete. I have got enough of this stuff," he turned to the concrete pavement of an adjacent street. The party was surprised that the machine did not skid either in turning corners or when the brakes were applied. It was noticed that other automobilists were also heading for the concrete pavement.

Hennepin County a Leader in Concrete Road Construction

PROGRESSIVE communities reveal themselves very readily by their interestedness in the subject of good road building and maintenance. Hennepin County, Minnesota, in which is located the city of Minneapolis, is notably among the first as far as activities in road building in this section of the country is concerned. Although this county is well organized for road work we cannot overlook the creditable work being done by the small towns of the Missabe Range, such as Bemidji and Eveleth. Concrete seems to be the rule and not the exception in the building of the newest roads in this section of the country and every new concrete road built seems to be the forerunner of others still to be constructed.

Notably among the latter is the well-known Richfield Road, of Minneapolis. The success of this road led to concrete being specified for 15 other streets located in different parts of Minneapolis, totaling at least 50,000 square yards. About 120,000 square yards were specified for concrete in 1913, but only 50,000 yards were completed. The present Richfield Road is in strong contrast to the one replaced by it which was simply a fill across a swamp and sometimes quite impassable. The old road has been replaced by a beautiful stretch of concrete pavement with cement curb and gutter, 30 feet wide and ½-mile in length. The city was free to designate the type of pavement on account of the fact that the road is a connecting link between a cemetery and a park. It bears a very heavy traffic to the outlying parks southwest of the city and is

Concrete on the Richfield Road, Minneapolis also the only business street between the main part of the city and a very large residence district. The pavement has proven very satisfactory since being laid in 1913, which fact is eloquently attested by the accompanying photographs.

The city engineer, Andrew Rinker, wished to demonstrate one thing in the construction of this road and that was the practicability of using local materials in the construction of this ½-mile of concrete paving, making a demonstration of concrete paving at the same time. The pavement was constructed of a 1:2:4 mixture, 7 inches thick throughout, local aggregates being used entirely. It is to be hoped that Hennepin County will soon improve its main highways with concrete connecting these newly improved streets.

An Important Detail in Concrete Road Construction

ENGINEERING RECORD stated editorially in its issue of June 20: "Difficulties experienced with two recently built concrete roads point to the necessity for impressing on constructors the importance of making the plane of all joints vertical. This, at first sight, seems a minor detail. The experiences cited below, however, are convincing to the contrary.

"On one of the roads the joint planes were inclined at an angle of as much as 30 degrees with the vertical. When warm weather came, within less than a month of the completion of the job, the expansion caused one slab to move up on its neighbor.

"The other case was more interesting and baffled the investigators for some time. There appeared at about eighteen points in a stretch of a mile a chipping away of the upper surface of the concrete, the spalling being in thin slabs about 2 inches thick, extending back sometimes several feet from the joint and across the entire width of the roadway. Strangely, the spalling always took place on the same side of the joint, counting in the direction of travel. Apparently there was but little disturbance of the slab below a plane 2 inches beneath the surface of the road.

"It was finally disclosed that the contractor on stopping work each day had finished the wet concrete to a chisel edge on a slope of about 45 degrees. On resuming work the following morning the chisel edge was broken off, but in practically all cases not back far enough to secure a vertical joint for the entire thickness of the pavement. The lower part of the joint was vertical, but the upper part was inclined at an angle of 45 degrees. The result was just what might have been expected. The expansion of the slabs broke off the 2-inch layer that could not, on account of the 45-degree inclination, take compression. No expansion joint was placed in this pavement, and consequently the trouble was found only at the points where work had been stopped for the day.

"It is not necessary to moralize on this subject. Every road builder will draw the conclusion that his inspectors must insist upon vertical planes at the joints. Only in this way can the concrete take the compression that must be expected on expansion."

Road Meeting Dates

American Highway Association
Fourth American Road Congress
Atlanta, November 9-13, 1914.

Fifth American Good Roads Congress
American Road Builders' Assn., 11th Annual Convention
Sixth Annual Exhibition of Machinery and Materials
Chicago, December 14-17, 1914.

Northwestern Road Congress, First Annual Convention
Milwaukee, October 28-31, 1914.

Concrete Roads and the Press

VERMONT GIVES UP THE MAKING OF STONE ROADS

New York, May 5.—Scarcely less important than the recent road message of Gov. Glynn, of New York, is the announcement of the road policy adopted for this year by Vermont. As explained by State Highway Commissioner Charles W. Gates at a recent meeting of Town Road Commissioners, he intends to use the State appropriation of about $250,000 in building trunk roads and to spend funds amounting to more than $75,000 derived from motor vehicles, in keeping the most traveled routes in repair. He will abandon macadam and other types of expensive construction, and return to earth and gravel-road making on the less traveled highways.

For every mile of graveled road that is made instead of macadam, the State can build one mile of concrete road instead of macadam, without the combined cost exceeding that of two miles of macadam or stone road. Gravel roads, cost ing $2,000 to $3,000 a mile, will meet the demands of the farmers and automobile tourists, and concrete or brick roads costing from $10,000 to $25,000 a mile, will be a boon to all users of motor trucks and passenger vehicles, to school children and other pedestrians, and to property owners. Gravel, brick and concrete roads cost much less to keep in repair than macadam roads, so the adoption of this policy should result in an annual saving of several hundred dollars a mile over the all-macadam system.—*Johnston, Pa. Tribune,* May 5.

Bradt Says Half Illinois Road Money Is Wasted

SECRETARY OF ILLINOIS HIGHWAY COMMISSION RAPS TEMPORARY AND COSTLY CONSTRUCTION

Springfield, Ill., May 27.—"Temporary improvement" and wasteful expenditure, due to misinformation of highway officials, has resulted in a waste of a large part of the $50,000,000 which has been expended on Illinois roads during the last ten years, according to Secretary S. E. Bradt of the state highway commission.

"HALF OF MONEY WASTED"

"Investigation shows that we are spending on our country roads approximately $7,000,000 annually, probably not less than $50,000,000 in the last ten years. And yet less than 10 per cent of our roads are improved with gravel, macadam concrete and brick, and probably less than 30 per cent additional are thoroughly dragged. Without doubt 40 to 50 per cent of the money has been spent in temporary work that has brought no lasting benefit.

"It is estimated that about $2,500,000 annually has been paid for bridges and culverts. Bridges have been built of steel, when concrete could have been used with but very little, if any, additional cost. In building culverts, many commissioners use corrugated steel or sewer pipe, when concrete could be used at a small additional cost and with permanent results."—*Chicago Evening Post,* May 22.

Frees $1,100,000 For Illinois Roads

SUPREME COURT DECISION ENABLES TREASURER TO PAY OUT THE FUNDS APPROPRIATED

By Oscar E. Hewitt

The state Supreme Court decided June 17 that the Tice good roads law is constitutional. This permits the state treasurer to pay out at once $400,000 of money appropriated by the legislature and $700,000 after July 1.

Some of the counties are ready to start work within a short time.

A. D. Gash, chairman of the state highway commission, estimated last night that road construction will be started this year in "sixty to seventy-five counties."

The counties are required to duplicate the amount contributed by the state—$1,100,000. In addition there will be considerable road construction in progressive counties without the aid of the state. Will County will spend $55,000, and Du Page $30,000 from their own funds.

Cook County Not Yet Ready

The state commission has become tired of waiting for the Cook County board and has prepared specifications for two roads to be constructed of concrete. These will be presented to the commissioners at their session tomorrow.

Start in Thirty Days Possible

If the commissioners approve of the specifications, bids may be asked, received, contract awarded and construction actually started in about thirty days. The two roads are: Halsted street between Riverdale and Harvey, a distance of approximately five-eights of a mile, and South Park avenue between Harvey and Homewood, about two miles in length.—*Chicago Tribune*, June 17.

State Board Praises Milwaukee's Roads

COUNTY IS PIONEER IN CONCRETE CONSTRUCTION, SAYS CHAIRMAN OF COMMISSION

Members of the state highway commission who made a tour of county roads on Friday with members of the highway committee of the county board expressed satisfaction with the work.

"We have visited most of the counties of the country which are using concrete in road construction," said John Hazelwood, chairman of the state commission, "and it is a pleasure to say that the concrete roads in Milwaukee County are in every way as good as the roads built elsewhere. I do not even except the roads in Wayne County, Michigan, which are recognized to be the highest type of concrete highways.

"I understand that when the plans for the present season are completed, Milwaukee County will have seventy-five miles of good roads. It is practically a pioneer in concrete road work. We are constantly in receipt of requests from other sections of the country as well as from Canada regarding work done by Milwaukee, which shows that the eyes of road builders are directed here.

"At the rate the road work is being done, within five years there will be no part of Milwaukee County which can not be reached with any sort of vehicle at any time of the year. That it will be of untold advantage to everybody concerned goes without saying. The state highway commission is proud of Milwaukee County."—*Milwaukee Sentinel*, June 13.

Concrete for Roads County Board Order

COMMISSIONERS FINALLY DECIDE ON RECOMMENDATION TO HIGHWAY AUTHORITIES

CHOSEN BECAUSE CHEAPER

STEPS TO BE TAKEN AT ONCE TO ADVERTISE FOR BIDS FOR WORK THIS YEAR

The county board yesterday made recommendation to the state highway commission that Cook County roads improved this year under the state aid law be built of concrete. For weeks the board has been fighting over the relative merits of concrete and vitrified brick.

"Concrete is less expensive and it will mean that Cook County will get twenty-one miles of improved roads the first year instead of fourteen," argued Commissioner Avery Coonley of Riverside.

The roads and bridges committee reported in favor of brick, but the recommendation was amended by the board. George A. Quinlan, county superintendent of highways, announced that immediate steps would be taken to advertise for bids on road work.—*Chicago Herald*, June 23.

Eighth Annual Chicago Cement Show

EXHIBITS comprising cement products, cement and concrete machinery, reinforcing materials, coloring mixtures, fireproofing systems, and other articles pertaining to the use of Portland cement will be brought together during the Eight Chicago Cement Show to be held at the Coliseum, February 10-17, 1915. The show is under the management of the Cement Products Exhibition Co., 208 South La Salle Street, Chicago. Plans are well under way for the 1915 Show and the first allotment of space will be made by drawing on Saturday, August 8, 1914, at the office of the Cement Products Exhibition Co. Only those whose applications are filed on or before noon, Saturday, August 1, 1914, will be permitted to participate in this drawing. Further information may be obtained by writing the show management.

Finishing and Curing Concrete Road Surfaces

OF VITAL importance, and second only to the use of proper specifications, are the methods of finishing and curing concrete road surfaces.

One of the fifteen committees delegated to make report to the National Conference on Concrete Road Building, February 12-13-14, 1914, was given this subject to study. The committee consisted of F. E. Turneaure, Dean, College of Engineering, University of Wisconsin, *Chairman*: H. J. Kuelling, President, Wisconsin Highway Commissioners' Association, Milwaukee, and E. B. Boyer, Engineer, Atlas Portland Cement Co., New York. The report which follows needs no comment.

No attempt has been made to formulate specific recommendations or specifications, but we have endeavored to analyze the subject and present the salient features in a manner which may form a basis of discussion and future consideration.

In finishing and curing a concrete pavement the operations may be considered in three parts:

1. The securing of a surface which shall, in general, have the desired grade and cross-section.
2. Finishing the surface so as to secure the desired degree of smoothness.
3. Curing of the concrete so as to produce as hard and dense a material as is reasonably practicable.

SECURING THE CORRECT GRADE AND CROSS-SECTION

The question of accurate grade and cross-section is of considerable importance in producing a surface which will be free from undesirable irregularities. Small irregularities give unsatisfactory conditions for traffic at high speed, such as automobile traffic, while large irregularities give rise to depressions and pockets likely to hold water and become icy and also lead to unequal wear. To secure good results, grade stakes should be accurately set, and where side strips serve as grade lines, they should be set with care and be straight and true. The tendency of modern practice in the construction of hard road surfaces is to reduce the crown of the road to a minimum. If the results are to be satisfactory under these conditions, increased accuracy in grade and cross-section will be necessary.

Narrow roadways are usually brought to grade and line by striking off the fresh concrete by means of a board, cut to conform to the desired shape of the road, and resting at its ends on longitudinal strips laid to grade. Where care is used in setting these strips and manipulating the board, accurate results are secured. In the case of wide roadways and city streets grade points must be established at frequent intervals in order to secure the desired accuracy. There is much poor work along this line to be seen on many of our city streets, even where asphalt surface is employed. Much more care should be used on this part of the work than is the practice at many places.

FINISHING OF SURFACE

The method of finishing the surface of the concrete after it is brought to line and grade is a matter of considerable importance, although the wear of traffic will soon eliminate small differences in the degree of smoothness secured. One of the principal objects to be attained in the surface finishing, after the concrete is struck off, is to secure a surface layer which will be as uniform in character as practicable, and free from voids and other irregularities. The securing of a good dense and even surface is dependent, to a considerable extent, on the care with which the concrete has been shoveled and stirred into place. Uniform and careful workmanship in this part of the process is important. Concrete which has an excess of large stones at one point and an excess of mortar at another point will not wear uniformly, and cannot be made uniform in the finishing process.

A common practice is to finish the surface by means of a wooden float manipulated from a bridge. Good results can be, and have been, obtained also by the use of the shovel alone. To secure a surface which is uniformly somewhat rough, the use of a coarse broom is common and is to be commended, although a short period of wear will eliminate any differences due to brooming.

To secure additional roughness, especially on grades, grooves have often been made in the concrete. Results of such grooving have been variously reported, some reports being satisfactory while others show unsatisfactory results due to the rapid wearing of the concrete and the disappearance of the grooves. It is evident that to accomplish any very lasting result the grooves must be fairly deep and not spaced too closely. A diagonal rather than a transverse system appears to be an advantage, but is not so easy to construct. Longitudinal grooves are of very doubtful value.

Where the experience with grooves has been satisfactory, it appears that the surface layer of concrete has been of rather superior quality and made of fine aggregate. This would appear to be a reasonable condition, and from observation of some of the members of the committee, as well as from various reports, a grooved surface made in rich, high-grade material will show a very satisfactory durability. Grooves would hardly appear to be advisable in connection with a coarse aggregate.

CURING

The curing of the exposed surface of the concrete is one of the most important parts in the entire process. Good concrete can easily be spoiled by a too rapid drying out, and under the conditions frequently met with, such a result may easily follow, unless great care is taken to protect it. Laboratory tests of concrete cured under different conditions show that it is easy to increase the strength 50 per cent by a proper treatment over what may be secured under improper conditions. It appears, also, that the effect of rapid drying is even greater on the hardness of a concrete surface and on its permeability than on its crushing strength. Concrete allowed to harden without proper curing shows a soft surface which can readily be scratched. It is, at the same time, much more porous than properly cured material and will show greater deterioration from frost action. The length of time during which concrete will continue to absorb water in chemical combination is much greater than is generally supposed. While the hardening process continues quite slowly after the lapse of a month, it is also true that with a continued supply of water, increase in strength beyond that time will be very considerable. The critical time in securing a good instead of a bad result is included, perhaps, in the first week; but for the best practical results a week is often too short.

The essential thing is, of course, to keep the concrete wet a sufficient length of time to secure the best results consistent with the expense involved and the improvement which will result. In hot summer weather it may be considered as absolutely necessary that this process shall be continued for at least 7 days. A number of specifications require 14 days, and a longer time is occasionally demanded. A mere sprinkling once a day in hot, sunny weather is certain to be very ineffective. When it is remembered that the actual evaporation from a free water surface during hot, dry weather is as great as ¼ inch per day, it is obvious that a single daily sprinkling, with no protection against evaporation, is very inadequate. To prevent evaporation, an excellent and common practice is to cover the surface as soon as practicable with a layer of earth. This serves to reduce the evaporation very greatly and would seem to be almost necessary under high summer temperatures. The concrete thus covered should be sprinkled frequently enough to keep the surface in a moist condition. For the first 24 hours after laying, or until the surface can be safely covered with earth, a canvas covering on hot windy days is advantageous and is used by some engineers. Traffic should be kept off at least 3 weeks and longer when possible, especially late in the season when the temperatures are relatively low.

As a matter of some value, your committee has made a search through recent engineering literature on the subject assigned to it. The results of this search may be briefly summarized as follows:

Out of twenty-one reports of actual construction and seven specifications and papers on this subject, the method of finishing was reported as follows: Fifteen finished by means of a float, four by means of troweling. Thirteen broomed the surface.

In the matter of curing, three reported as using canvas, eight as using sand and earth; four reported 7 days as the period of sprinkling, two 14 days, and one 21 days.

DISCUSSION

K. H. Talbot:[1]—In connection with the brooming of the surfaces and the drying out I would like to tell of an investigation of a road that was reported as being chalky. I found that it had been broomed and was apparently chalky on the top within two or three days after brooming. I could take a knife and scrape off the ridges that were left by the brooming, and find the hardened concrete beneath. I ascribed this to two things: the ridges offered more area for the wind to strike and resulted in drying out, and the film of concrete in each one of the ridges was small, so that the drying out was very rapid. I feel, therefore, that under summer conditions, with sufficient curing and protection, it is a mistake to broom the surface.

E. S. Larned:[2]—There is another injury that can be caused by brooming. The ordinary stable broom is made of rattan bristles that are stiff. These bristles are set practically at right angles to the handle, so that when the broom is dragged through the concrete it not only creates a ridge, but it disturbs a very considerable portion of the concrete itself. Besides, that application is not made to the surface until the concrete has taken a considerable set. I would very strongly advocate the use of the wood float only. The advantage produced by brooming is only temporary and the ridges soon wear off. The brooming certainly destroys some of the slab.

H. P. Gillette:[3]—In addition to the three ways of curing or wetting the surface of concrete mentioned by the committee, I should like to call your attention to a fourth method that has been introduced in California. It is claimed to be very effective and quite as cheap as the other ways. This is to build up small dikes across the concrete and to flood the space with water to a depth of about two inches. The trouble of having to scrape off the dirt afterwards is eliminated.

Rupert Smith:[4]—Curing by steam is another method that has been mentioned. This offers considerable possibilities, especially under winter conditions.

C. F. Myers:[5]—With the temperature not over 80 degrees, would any surface covering be necessary, or would sprinkling be sufficient?

K. H. Talbot:—In my opinion the covering is necessary even when the temperature is as low as 80 degrees. The water will never be at that temperature, and, therefore, sprinkling directly on the concrete has the effect of cold water coming in contact with a warm surface, as the concrete will assuredly be at the same temperature as the air.

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[1] K. H. Talbot, Assistant Inspecting Engineer, Universal Portland Cement Co., Pittsburgh.

[2] E. S. Larned, care of Lehigh Portland Cement Co., Boston, Mass.

[3] H. P. Gillette, Editor-in-Chief, Engineering & Contracting, Chicago.

[4] Rupert Smith, Civil Engineer, Newport News, Va.

[5] C. F. Meyer, Engineer, Morell & Nichols, Minneapolis.

[6] F. E. Turneaure, Dean, College of Engineering, University of Wisconsin.

Dean F. E. Turneaure:[6]—The suggestion of curing by ponding, as is done in California, and the method of curing by steam, are certainly good. It would seem that the curing proposition is really the important point in the report of this Committee.

Obsequies of Inferior Culvert Materials

LIVINGSTON COUNTY, Illinois, had a unique celebration on Good Roads Day, April 15, 1914. It was a mock burial of inferor culvert materials.

A concrete monument, typifying the material and permanence of the concrete culvert, which will be used in future work, now stands above three graves in which Livingston County's Superintendent of Highways, R. W. Osborn, buried three old sections of culvert, types which are no longer considered serviceable.

The illustration below shows the "Hard Roads Cemetery." As a matter of fact, this might be called other than a "Hard Roads Cemetery," as in it are buried only impermanent culvert materials, leaving permanent materials very much alive in Livingston County.

While this mock burial was only a bit of fun indulged in by the County Highway men yet it had a real meaning for the tax payers. It meant that no more of their funds are to be expended in such a way as to require constantly recurring repair charges. It meant that those materials are to be dropped and a more efficient material—CONCRETE—is to be used in their places. This move would be a good one in any county.

New Personnel of the American Highway Association

RECENT ambassadorial appointments by President Wilson from the directorate of the American Highway Association have made necessary an election to name two new directors. Walter H. Page, now Ambassador to Great Britain, is succeeded by Richard H. Edmonds, editor and

Burying Impermanent Culvert Materials. Livingston County Terminates Use of Unsatisfactory Materials owner of *Manufacturers' Record*, Baltimore, and the late Alfred Noble by Gen. Clifford Anderson of Atlanta, Ga.

The officers of the Association are now as follows: Logan Waller Page, Director, United States Office of Public Roads, *President;* Fairfax Harrison, President Southern Railway Company, *Vice-President;* I. S. Pennybacker, *Executive Assistant;* Lee McClung, former Treasurer of the United States, *Treasurer;* James S. Harlan, Chairman Interstate Commerce Commission, *Chairman of the Board of Directors;* Leonard Tufts, of Pinehurst, N. C., *Chairman of the Executive Committee,* and Charles P. Light, former State Highway Commissioner of West Virginia, *Field Secretary.*

Kane County, Illinois, Celebrates Completion of Initial Section of Lincoln Highway at Mooseheart

JUNE 15 saw the formal dedication of 1500 feet of concrete road, the first section of the Lincoln Highway to be built in the state of Illinois. The inauguration of this work on Illinois Good Roads Day, by Governor Dunne and party was described in *Concrete Roads* for June. About 2,000 people, residents of Mooseheart and neighboring towns, turned out for the dedication. The town of Elgin sent a band and a delegation of good roads enthusiasts, headed by Fred W. Jencks, Secretary of the Kane County Good Roads Association. The speaker of the day was A. R. Pardington, Vice-President of the Lincoln Highway Association, Detroit. Mr. Pardington said in part:

> "As Abraham Lincoln was of the people, so this great modern highway is now and forever shall be for the people. As a tribute to his memory this highway is being built by the personal offerings of our citizens, and by such organizations as the one whose guest we are, The Loyal Order of Moose. It is fitting that the memorial highway should be established at this, the very heart of activity of the order at its vocational school and home. About 2,000 miles of this great memorial remains to be made worthy of their place on it. Those miles will be improved as has this portion by the patriotic co-operation of our citizens. As the 'American-family' part of this great Coast-to-Coast road it will be built and dedicated. Next week, in Elkhart, Indiana, a section similar to this is to be dedicated. Later in the season four more sections in this state are to be dedicated to public use. Later on four sections in Iowa, and still later, five sections in Nebraska."

Dedicating Concrete Highway at Mooseheart